Environmental Protection Department

Permits and Regulatory Affairs Division

UCRL-AR-144362-10

Lawrence Livermore National Laboratory Experimental Test Site

Annual Storm Water Monitoring Report for Waste Discharge Requirements 97-03-DWQ

July 2010

M. A. Revelli

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

Lawrence Livermore National Laboratory Experimental Test Site Annual Storm Water Monitoring Report for Waste Discharge Requirements 97-03-DWG

REGIONAL BOARD INFORMATION

REGION 5: CENTRAL VALLEY REGION, SACRAMENTO
Pamela Creedon, Executive Officer
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Rancho Cordova, CA 95670-6114
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GENERAL INFORMATION

A. Facility ID No.: 5S39I021179

B. Operation:
Lawrence Livermore National Security, LLC

Contact Person
Steven J. Wuthrich
Lawrence Livermore National Laboratory
P.O. Box 808, L-510
Livermore, CA 94551
(925) 423-1310

C. Facility/Site:
Site 300

Contact Person
John E. Scott
Lawrence Livermore National Laboratory
P.O. Box 808, L-871
Livermore, CA 94551
(925) 423-5026

Facility SIC Codes:

SIC Code 8733, Non-Commercial Research Organizations
SIC Code 9711, National Security
SIC Code 4953, Hazardous Waste Treatment (sector K) and Landfill and Land Application Sites (sector L)

Lawrence Livermore National Laboratory Experimental Test Site
Annual Storm Water Monitoring Report for Waste Discharge Requirements 97-03-DWQ
July 2010

State of California
STATE WATER RESOURCES CONTROL BOARD

2009-2010
ANNUAL REPORT
FOR
STORM WATER DISCHARGES ASSOCIATED
WITH INDUSTRIAL ACTIVITIES

Reporting Period July 1, 2009 through June 30, 2010

An annual report is required to be submitted to your local Regional Water Quality Control Board (Regional Board) by July 1 of each year. This document must be certified and signed, under penalty of perjury, by the appropriate official of your company. Many of the Annual Report questions require an explanation. Please provide explanations on a separate sheet as an attachment. **Retain a copy of the completed Annual Report for your records.**

Please circle or highlight any information contained in Items A, B, and C below that is new or revised so we can update our records. Please remember that a Notice of Termination and new Notice of Intent are required whenever a facility operation is relocated or changes ownership.

If you have any questions, please contact your Regional Board Industrial Storm Water Permit Contact. The names, telephone numbers and e-mail addresses of the Regional Board contacts, as well as the Regional Board office addresses can be found at http://www.waterboards.ca.gov/stormwtr/contact.html. To find your Regional Board information, match the first digit of your WDID number with the corresponding number that appears in parenthesis on the first line of each Regional Board office.

GENERAL INFORMATION:

A. Facility Information:

***Facility WDID No:* 5S39I021179**

Facility Business Name: Lawrence Livermore National Laboratory
Contact Person: John E. Scott - Site Manager
Physical Address: Corral Hollow Road
e-mail: scott14@llnl.gov
City: Tracy
CA Zip: 95376 Phone: (925) 423-5026
Standard Industrial Classification (SIC) Code(s): Facility SIC Codes 8733, Non-Commercial Research Organizations, and SIC Code 9711, National Security; and Regulated SIC Code 4953 Hazardous Waste Treatment (sector K) and Landfill and Land Application Sites (sector L)

B. Facility Operator Information:

Operator Name: Lawrence Livermore National Security, LLC
Contact Person: Steven J. Wuthrich
Mailing Address: P.O. Box 808, Mail Stop L-510
e-mail: wuthrich1@llnl.gov
City: Livermore
State: CA Zip: 94551 Phone: (925) 423-1310

C. Facility Billing Information:

Operator Name: Lawrence Livermore National Laboratory
Contact Person: Bruce Schultz
Mailing Address: P.O. Box 808, Mail Stop L-626
e-mail: schultz16@llnl.gov
City: Livermore
State: CA Zip: 94551 Phone: (925) 423-3978

Lawrence Livermore National Laboratory Experimental Test Site
Annual Storm Water Monitoring Report for Waste Discharge Requirements 97-03-DWQ,
National Pollutant Discharge Elimination System Permit No. CAS000001
July 2010

SPECIFIC INFORMATION

MONITORING AND REPORTING PROGRAM

D. SAMPLING AND ANALYSIS EXEMPTIONS AND REDUCTIONS

1. For the reporting period, was your facility exempt from collecting and analyzing samples from **two** storm events in accordance with sections B.12 or 15 of the General Permit?

   ☐ **YES** Go to Item D.2 ☒ **NO** Go to Section E

2. Indicate the reason your facility is exempt from collecting and analyzing samples from **two** storm events. Attach a copy of the first page of the appropriate certification if you check boxes ii, iii, iv, or v.

   i. ☐ Participating in an Approved Group Monitoring Plan **Group Name:** _____

   ii. ☐ Submitted **No Exposure Certification (NEC)** Date Submitted**:** ___/___/___

   Re-evaluation Date**:** ___/___/___

   Does facility continue to satisfy NEC conditions? ☐ YES ☐ NO

   iii. ☐ Submitted **Sampling Reduction Certification (SRC)** Date Submitted**:** ___/___/___

   Re-evaluation Date**:** ___/___/___

   Does facility continue to satisfy SRC conditions? ☐ YES ☐ NO

   iv. ☐ Received Regional Board Certification Certification Date**:** ___/___/___

   v. ☐ Received Local Agency Certification Certification Date**:** ___/___/___

3. If you checked boxes i or iii above, were you scheduled to sample **one** storm event during the reporting year?

   ☐ **YES** Go to Section E ☐ **NO** Go to Section F

4. If you checked boxes ii, iv, or v, go to Section F.

E. SAMPLING AND ANALYSIS RESULTS

1. How many storm events did you sample? 2

   If less than 2, **attach explanation** (if you checked item D.2.i or iii. above, only attach explanation if you answer "0").

2. Did you collect storm water samples from the first storm of the wet season that produced a discharge during scheduled facility operating hours? (Section B.5 of the General Permit)

   ☒ **YES** ☐ **NO** **attach explanation** **(Please note that if you do not sample the first storm event, you are still required to sample 2 storm events)**

3. How many storm water discharge locations are at your facility? 5 (See explanation.)

4. For each storm event sampled, did you collect and analyze a sample from each of the facility's' storm water discharge locations? ☐ YES, go to Item E.6 ☒ NO

   See explanation.

5. Was sample collection or analysis reduced in accordance with Section B.7.d of the General Permit? ☐ YES ☒ NO, **attach explanation**

   If "YES", **attach documentation** supporting your determination that two or more drainage areas are substantially identical.

   Date facility's drainage areas were last evaluated ___/___/_____

6. Were <u>all</u> samples collected during the first hour of discharge? ☐ YES ☒ NO, **attach explanation**

7. Was <u>all</u> storm water sampling preceded by three (3) working days without a storm water discharge? ☒ YES ☐ NO, **attach explanation**

8. Were there any discharges of storm water that had been temporarily stored or contained? (such as from a pond) ☐ YES ☒ NO, go to Item E.10

9. Did you collect and analyze samples of temporarily stored or contained storm water discharges from two storm events? (or one storm event if you checked item D.2.i or iii. above) ☐ YES ☐ NO, **attach explanation**

10. Section B.5. of the General Permit requires you to analyze storm water samples for pH, Total Suspended Solids (TSS), Specific Conductance (SC), Total Organic Carbon (TOC) or Oil and Grease (O&G), other pollutants likely to be present in storm water discharges in significant quantities, and analytical parameters listed in Table D of the General Permit.

    a. Does Table D contain any additional parameters related to your facility's SIC code(s)? ☒ YES ☐ NO, Go to Item E.11

    b. Did you analyze all storm water samples for the applicable parameters listed in Table D? ☒ YES ☐ NO

    c. If you did not analyze all storm water samples for the applicable Table D parameters, check one of the following reasons:

       _____ In prior sampling years, the parameter(s) have not been detected in significant quantities from two consecutive sampling events. **Attach explanation**

       _____ The parameter(s) is not likely to be present in storm water discharges and authorized non-storm water discharges in significant quantities based upon the facility operator's evaluation. **Attach explanation**

       _____ Other. **Attach explanation**

11. For each storm event sampled, attach a copy of the laboratory analytical reports and report the sampling and analysis results using **Form 1** or its equivalent. The following must be provided for each sample collected:

    - Date and time of sample collection
    - Name and title of sampler
    - Parameters tested
    - Name of analytical testing laboratory
    - Discharge location identification
    - Testing results
    - Test methods used
    - Test detection limits
    - Date of testing
    - Copies of the laboratory analytical results

    See explanation.

F. QUARTERLY VISUAL OBSERVATIONS

1. **Authorized Non-Storm Water Discharges**

Section B.3.b of the General Permit requires quarterly visual observations of all authorized non-storm water discharges and their sources.

a. Do authorized non-storm water discharges occur at your facility?

☐ **YES** ☒ **NO** Go to Item F.2

b. Indicate whether you visually observed all authorized non-storm water discharges and their sources during the quarters when they were discharged. **Attach an explanation for any "NO" answers**. Indicate "N/A" for quarters without any authorized non-storm water discharges.

July-September	☐ **YES**	☐ **NO**	☐ **N/A**	October-December	☐ **YES**	☐ **NO**	☐ **N/A**
January-March	☐ **YES**	☐ **NO**	☐ **N/A**	April-June	☐ **YES**	☐ **NO**	☐ **N/A**

c. Use **Form 2** to report quarterly visual observations of authorized non-storm water discharges or provide the following information:

i. name of each authorized non-storm water discharge
ii. date and time of observation
iii. source and location of each authorized non-storm water discharge
iv. characteristics of the discharge at its source and impacted drainage area/discharge location
v. name, title, and signature of observer
vi. **any** new or revised BMPs necessary to reduce or prevent pollutants in authorized non-storm water discharges. Provide new or revised BMP implementation date.

2. **Unauthorized Non-Storm Water Discharges**

Section B.3.a of the General Permit requires quarterly visual observations of all drainage areas to detect the presence of unauthorized non-storm water discharges and their sources.

a. Indicate whether you visually observed all drainage areas to detect the presence of unauthorized non- storm water discharges and their sources. **Attach an explanation for any "NO" answers**.

July-September	☒ **YES**	☐ **NO**	October-December	☒ **YES**	☐ **NO**
January-March	☒ **YES**	☐ **NO**	April-June	☒ **YES**	☐ **NO**

b. Based upon the quarterly visual observations, were any unauthorized non-storm water discharges detected?

☐ **YES** ☒ **NO** Go to Item F.2.d

c. Have each of the unauthorized non-storm water discharges been eliminated or permitted?

☐ **YES** ☐ **NO** **Attach explanation**

See explanation.

d. Use **Form 3** to report quarterly unauthorized non-storm water discharge visual observations or provide the following information:

i. name of each unauthorized non-storm water discharge
ii. date and time of observation
iii. source and location of each unauthorized non-storm water discharge
iv. characteristics of the discharge at its source and impacted drainage area/discharge location
v. name, title, and signature of observer
vi. **any** corrective actions necessary to eliminate the source of each unauthorized non-storm water discharge and to clean impacted drainage areas. Provide date unauthorized non-storm water discharge(s) was eliminated or scheduled to be eliminated.

G. MONTHLY WET SEASON VISUAL OBSERVATIONS

Section B.4.a of the General Permit requires you to conduct monthly visual observations of storm water discharges at all storm water discharge locations during the wet season. These observations shall occur during the first hour of discharge or, in the case of temporarily stored or contained storm water, at the time of discharge.

1. Indicate below whether monthly visual observations of storm water discharges occurred at all discharge locations. **Attach an explanation for any "NO" answers**. Include in this explanation whether any eligible storm events occurred during scheduled facility operating hours that did not result in a storm water discharge, and provide the date, time, name and title of the person who observed that there was no storm water discharge.

	YES	NO		YES	NO
October	☒	☐	February	☒	☐
November	☒	☐	March	☒	☐
December	☒	☐	April	☒	☐
January	☒	☐	May	☒	☐

LLNL conducted monthly wet season visual observations for storm water discharges (see explanation).

2. Report monthly wet season visual observations using **Form 4** or provide the following information:

   a. date, time, and location of observation
   b. name and title of observer
   c. characteristics of the discharge (i.e., odor, color, etc.) and source of any pollutants observed
   d. **any** new or revised BMPs necessary to reduce or prevent pollutants in storm water discharges. Provide new or revised BMP implementation date.

ANNUAL COMPREHENSIVE SITE COMPLIANCE EVALUATION (ACSCE)

H. ACSCE CHECKLIST

Section A.9 of the General Permit requires the facility operator to conduct one ACSCE in each reporting period (July 1-June 30). Evaluations must be conducted within 8-16 months of each other. The SWPPP and monitoring program shall be revised and implemented, as necessary, within 90 days of the evaluation. The checklist below includes the minimum steps necessary to complete a ACSCE. Indicate whether you have performed each step below. **Attach an explanation for any "NO" answers.**

1. Have you inspected all potential pollutant sources and industrial activities areas? ☒ YES ☐ NO
   The following areas should be inspected:

   - areas where spills and leaks have occurred during the last year
   - outdoor wash and rinse areas
   - process/manufacturing areas
   - loading, unloading, and transfer areas
   - waste storage/disposal areas
   - dust/particulate generating areas
   - erosion areas
   - building repair, remodeling, and construction
   - material storage areas
   - vehicle/equipment storage areas
   - truck parking and access areas
   - rooftop equipment areas
   - vehicle fueling/maintenance areas
   - non-storm water discharge generating areas

2. Have you reviewed your SWPPP to assure that its BMPs address existing potential pollutant sources and industrial activities areas? ☒ YES ☐ NO

3. Have you inspected the entire facility to verify that the SWPPP's site map is up-to-date? The following site map items should be verified: ☒ YES ☐ NO

   - facility boundaries
   - outline of all storm water drainage areas
   - areas impacted by run-on
   - storm water discharges locations
   - storm water collection and conveyance system
   - structural control measures such as catch basins, berms, containment areas, oil/water separators, etc.

4. Have you reviewed all General Permit compliance records generated since the last annual evaluation? ☒ YES ☐ NO

   The following records should be reviewed:

   - quarterly authorized non-storm water discharge visual observations
   - monthly storm water discharge visual observation
   - records of spills/leaks and associated clean-up/response activities
   - quarterly unauthorized non-storm water discharge visual observations
   - Sampling and Analysis records
   - preventative maintenance inspection and maintenance records

5. Have you reviewed the major elements of the SWPPP to assure compliance with the General Permit? ☒ YES ☐ NO

   The following SWPPP items should be reviewed:

   - pollution prevention team
   - list of significant materials
   - description of potential pollutant sources
   - assessment of potential pollutant sources
   - identification and description of the BMPs to be implemented for each potential pollutant source

6. Have you reviewed your SWPPP to assure that a) the BMPs are adequate in reducing or preventing pollutants in storm water discharges and authorized non-storm water discharges, and b) the BMPs are being implemented? ☒ YES ☐ NO

   The following BMP categories should be reviewed:

   - good housekeeping practices
   - spill response
   - employee training
   - erosion control
   - quality assurance
   - preventative maintenance
   - material handling and storage practices
   - waste handling/storage
   - structural BMPs

7. Has all material handling equipment and equipment needed to implement the SWPPP been inspected? ☒ YES ☐ NO

I. ACSCE EVALUATION REPORT

The facility operator is required to provide an evaluation report that includes:

- identification of personnel performing the evaluation
- the date(s) of the evaluation
- necessary SWPPP revisions
- schedule for implementing SWPPP revisions
- any incidents of non-compliance and the corrective actions taken

Use **Form 5** to report the results of your evaluation or develop an equivalent form.

J. ACSCE CERTIFICATION

The facility operator is required to certify compliance with the Industrial Activities Storm Water General Permit. To certify compliance, both the SWPPP and Monitoring Program must be up to date and be fully implemented.

Based upon your ACSCE, do you certify compliance with the Industrial Activities Storm Water General Permit? ☒ YES ☐ NO

If you answered "NO" **attach an explanation** to the ACSCE Evaluation Report why you are not in compliance with the Industrial Activities Storm Water General Permit.

ATTACHMENT SUMMARY

Answer the questions below to help you determine what should be attached to this annual report. Answer NA (Not Applicable) to questions 2-4 if you are not required to provide those attachments.

1.	Have you attached Forms 1,2,3,4, and 5 or their equivalent?	☒ YES (Mandatory)		
2.	If you conducted sampling and analysis, have you attached the laboratory analytical reports?	☒ YES	☐ NO	☐ NA
	Copies of the analytical reports are provided in the Supplement submitted with this report. The original laboratory reports are maintained in LLNL's data management system.			
3.	If you checked box II, III, IV, or V in item D.2 of this Annual Report, have you attached the first page of the appropriate certifications?	☐ YES	☐ NO	☒ NA
4.	Have you attached an explanation for each "NO" answer in items E.1, E.2, E.5-E.7, E.9, E.10.c, F.1.b, F.2.a, F.2.c, G.1, H.1-H.7, or J?	☒ YES	☐ NO	☐ NA

ANNUAL REPORT CERTIFICATION

I am duly authorized to sign reports required by the INDUSTRIAL ACTIVITIES STORM WATER GENERAL PERMIT (see Standard Provision C.9) and I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those person directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed Name: Steven J. Wuthrich

Signature: _____ Date: _____

Title: Director, Environment, Safety & Health

DESCRIPTION OF BASIC ANALYTICAL PARAMETERS

The Industrial Activities Storm Water General Permit (General Permit) requires you to analyze storm water samples for at least four parameters. These are pH, Total Suspended Solids (TSS), Specific Conductance (SC),and Total Organic Carbon (TOC). Oil and Grease (O&G) may be substituted for TOC. In addition, you must monitor for any other pollutants which you believe to be present in your storm water discharge as a result of industrial activity and analytical parameters listed in Table D of the General Permit. There are no numeric limitations for the parameters you test for.

The four parameters which the General Permit requires to be tested are considered *indicator* parameters. In other words, regardless of what type of facility you operate, these parameters are nonspecific and general enough to usually provide some indication whether pollutants are present in your storm water discharge. The following briefly explains what each of these parameters mean:

pH is a numeric measure of the hydrogen-ion concentration. The neutral, or acceptable, range is within 6.5 to 8.5. At values less than 6.5, the water is considered acidic; above 8.5 it is considered alkaline or basic. An example of an acidic substance is vinegar, and a alkaline or basic substance is liquid antacid. Pure rainfall tends to have a pH of a little less than 7. There may be sources of materials or industrial activities which could increase or decrease the pH of your storm water discharge. If the pH levels of your storm water discharge are high or low, you should conduct a thorough evaluation of all potential pollutant sources at your site.

Total Suspended Solids (TSS) is a measure of the undissolved solids that are present in your storm water discharge. Sources of TSS include sediment from erosion of exposed land, and dirt from impervious (i.e. paved) areas. Sediment by itself can be very toxic to aquatic life because it covers feeding and breeding grounds, and can smother organisms living on the bottom of a water body. Toxic chemicals and other pollutants also adhere to sediment particles. This provides a medium by which toxic or other pollutants end up in our water ways and ultimately in human and aquatic life. TSS levels vary in runoff from undisturbed land. It has been shown that TSS levels increase significantly due to land development.

Specific Conductance (SC) is a numerical expression of the ability of the water to carry an electric current. SC can be used to assess the degree of mineralization, salinity, or estimate the total dissolved solids concentration of a water sample. Because of air pollution, most rain water has a SC a little above zero. A high SC could affect the usability of waters for drinking, irrigation, and other commercial or industrial use.

Total Organic Carbon (TOC) is a measure of the total organic matter present in water. (All organic matter contains carbon) This test is sensitive and able to detect small concentrations of organic matter. Organic matter is naturally occurring in animals, plants, and man. Organic matter may also be man made (so called synthetic organics). Synthetic organics include pesticides, fuels, solvents, and paints. Natural organic matter utilizes the oxygen in a receiving water to biodegrade. Too much organic matter could place a significant oxygen demand on the water, and possibly impact its quality. Synthetic organics either do not biodegrade or biodegrade very slowly. Synthetic organics are a source of toxic chemicals that can have adverse affects at very low concentrations. Some of these chemicals bioaccumulate in aquatic life. If your levels of TOC are high, you should evaluate all sources of natural or synthetic organics you may use at your site.

Oil and Grease (O&G) is a measure of the amount of oil and grease present in your storm water discharge. At very low concentrations, O&G can cause a sheen (that floating "rainbow") on the surface of water (1 qt. of oil can pollute 250,000 gallons of water). O&G can adversely affect aquatic life and create unsightly floating material and film on water, thus making it undrinkable. Sources of O&G include maintenance shops, vehicles, machines and roadways.

If you have any questions regarding whether or not your constituent concentrations are too high, please contact your local Regional Board office. The United States Environmental Protection Agency (USEPA) has published stormwater discharge benchmarks for a number of parameters. These benchmarks may be helpful when evaluating whether additional BMPs are appropriate. These benchmarks can be accessed at our website at http://www.waterboards.ca.gov. It is contained in the Sampling and Analysis Reduction Certification.

See Storm Water Contacts at

http://www.waterboards.ca.gov/water_issues/programs/stormwater/contact.shtml

Attachment 1

Explanations
Figure 1 and Tables 1 & 2

Explanations

E. SAMPLING AND ANALYSIS RESULTS

3. **Figure 1** shows the five storm water sample locations. Two additional sample locations, labeled CARW2 and GEOCRK, represent the off-site receiving water upstream and downstream, respectively, of the Experimental Test Site (Site 300). One location not shown on **Figure 1**, NLIN (approximately 20 yards south of location NLIN2), was sampled during the 2/9/10 storm for selected analytes; results are included in **Form 1.**

4. & 5. Locations labeled N829 and NPT6 (see **Figure 1**) were not sampled because they did not discharge offsite. These drainages would discharge offsite only during excessive storm events, greater than the 1997-1998 El Nino season.

6. Normally, it is not possible to determine exactly when flow begins at each runoff sampling location. For the 10/13/09 storm, measurable rainfall was recorded between 5:00 am and 8:00 pm. For the 2/9/10 storm, measurable rainfall was recorded between 5:00 am and 8:00 am. Lawrence Livermore National Laboratory (LLNL) samples the runoff as soon as possible.

11. LLNL has reported the analytical results on **Form 1**. Results that exceeded EPA Benchmarks are discussed in **Attachment 3**. Copies of the analytical reports and chains of custody are provided in a **Supplement** submitted with this report. The original laboratory reports are maintained in LLNL's data management system.

F. QUARTERLY VISUAL OBSERVATIONS

2. **Unauthorized Non-Storm Water Discharges**

c. **Table 1** includes all unplanned non-routine releases that were not observed during visual inspections but are documented as part of the LLNL's spill response procedures. Of the five unplanned non-routine releases reported in **Table 1**, none resulted in a discharge to the Site 300 storm water drainage system.

G. MONTHLY WET SEASON VISUAL OBSERVATIONS

1. Monthly wet season visual observations are reported on **Form 4** and copies of the LLNL Observation Forms are provided in the **Supplement** submitted with this report. All wet season observations, except the November 2009 and the May 2010 observations, were conducted in conjunction with a storm. See **Table 2** for monthly rainfall totals.

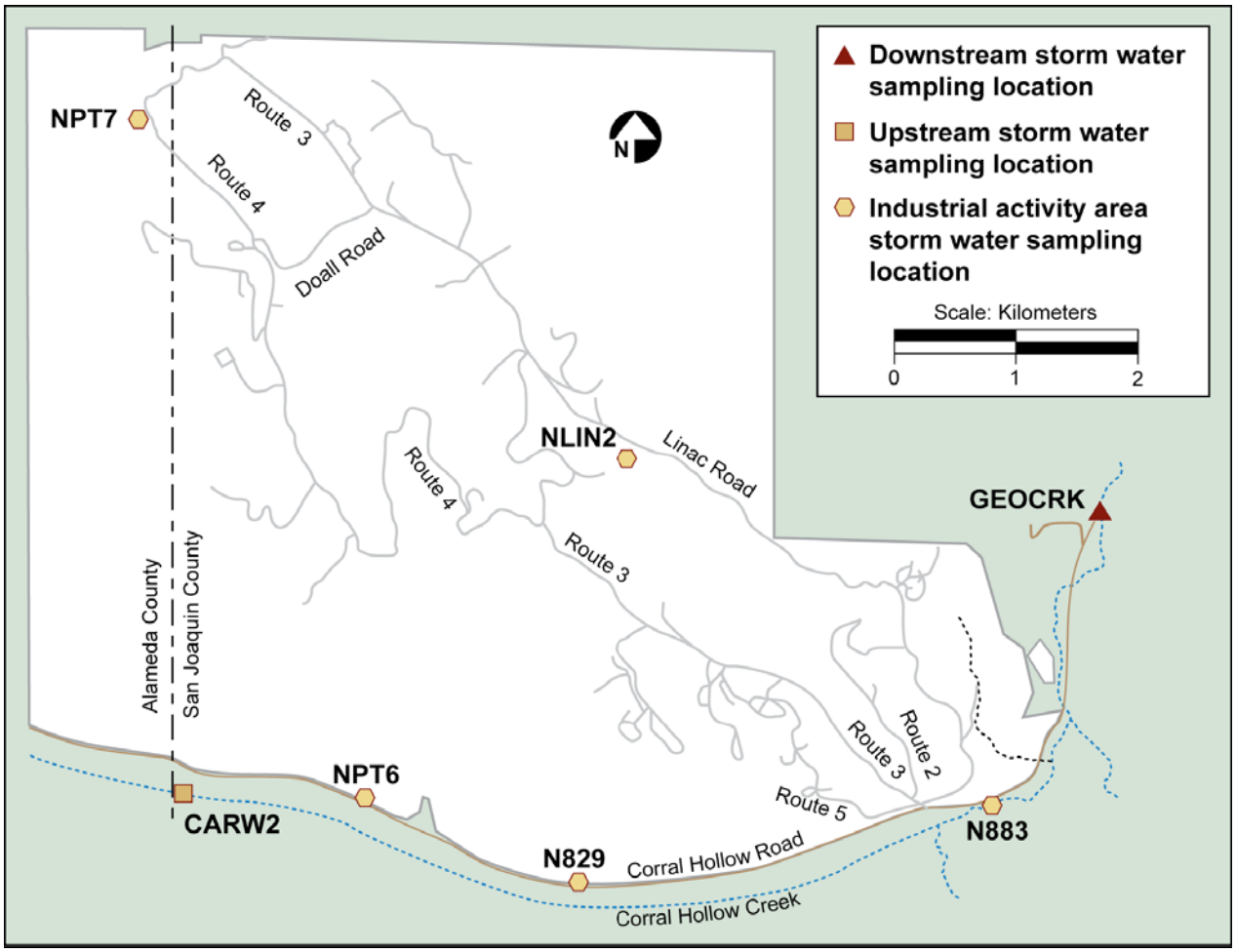

Figure 1. Storm water sampling locations at Site 300.

Table 1. Summary of non-routine releases, June 2009 through May 2010.

Date	Location	Description
6/18/09	B850	Release to asphalt of approximately two gallons of diesel fuel from a refueling truck at the B850 soil remediation project. Soil was immediately placed on the spill and later transferred into a plastic bag for management by RHWM.
8/5/09	B879	A B879 Motor Pool steam-cleaning unit malfunctioned, causing the system to add make-up water and overflow the surrounding berm. Approximately ten gallons of water with trace oil content was released from the berm to the asphalt in the surrounding area. The water traveled along the east side of B879 and started down the south slope, where the water trail dissipated. No water reached a storm drain, culvert, or other conduit to the environment. Absorbent mats were placed on the water trail leaving the berm. Water remaining in the berm was pumped out for disposal.
9/21/09	B875	Maintenance and Utility Services Department labor shop, responding to a report of a intermittent water discharge south of B875, discovered a clay pipe that was leaking approximately four feet below grade. The water appeared to be from a washing machine, which typically discharges to the sewage evaporation pond. The washing machine use was discontinued until the cause of the discharge was determined and mitigated.
12/3/09	B883	During transfer operations that involved emptying old tanks prior to disposal, 15-20 gallons of water containing <1% diala oil was released in front of the B883 Waste Accumulation Area. As the water was being pumped to a portable tank, the valve on the tank was inadvertently left open so the water with diala oil quickly began to discharge to ground. The pumping was stopped immediately, the valve closed, and absorbent placed on the released wastewater. The water with diala oil was contained on the asphalt and absorbent was used to clean it up.
4/27/10	B801	A 4" deionized (DI) water line valve from a closed loop cooling system broke, releasing approximately 200 gallons of water. The water ran down the road to the dirt drainage channel along the side of the road, where it soaked into the ground.

Table 2. Monthly rainfall totals (in cm) at Site 300 weather station, June 2009 through May 2010.

Date	**Monthly Total** (cm)
June 2009	0.00
July 2009	0.00
August 2009	0.03
September 2009	0.28
October 2009	3.78
November 2009	0.28
December 2009	3.63
January 2010	9.88
February 2010	6.20
March 2010	3.30
April 2010	3.81
May 2010	0.36
Water Year TOTAL	31.55

Attachment 2

Forms 1 through 5

Lawrence Livermore National Laboratory Experimental Test Site
Annual Storm Water Monitoring Report for Waste Discharge Requirements 97-03-DWQ
July 2010

Form 1- Sampling & Analysis Result for the First Storm Event 2009-10 Annual Report

- If analytical results are less than the detection limit (or non detectable), show the value as less than the numerical value of the detection limit (example: <.05)
- If you did not analyze for a required parameter, do not report "0". Instead, leave the appropriate box blank.
- When analysis is done using portable analysis (such as portable pH meters, SC meters, etc.), indicate "PA" in the appropriate test method used box.
- Make additional copies of this form as necessary.

NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Karl Brunckhorst

DESCRIBE DISCHARGE LOCATION	DATE/TIME OF SAMPLE COLLECTION	TIME DISCHARGE STARTED	ANALYTICAL RESULTS For First Storm Event									
			BASIC PARAMETERS					OTHER PARAMETERS				
			pH	TSS	SC	O & G	COD	Total Hardness	Ammonia Nitrogen (as N)	Cyanide	HMX	RDX
N883	10/13/09 8:30 [x] PM [ ]	Ongoing AM [x] PM [ ]	6.14	140	144	<5	440	N/S	3.00	0.0066	N/S	N/S
NPT7	10/13/09 9:20 [x] PM [ ]	Ongoing AM [x] PM [ ]	7.22	130	67.8	<5	35	N/S	0.28	<0.005	N/S	N/S
NLIN2	10/13/09 9:45 [x] PM [ ]	Ongoing AM [x] PM [ ]	7.05	390	1230	<5	430	430	1.60	0.014	310	<50
NLIN **NOT SAMPLED FIRST STORM**	10/13/09 AM [ ] PM [ ]	AM [ ] PM [ ]	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
CARW2 (Off-Site; in creek, upstream)	10/13/09 11:26 [x] PM [ ]	Ongoing AM [x] PM [ ]	7.48	1200	280	<5	98	200	0.33	<0.005	<1	<1
GEOCRK (Off-Site; in creek, downstream)	10/13/09 10:37 [x] PM [ ]	Ongoing AM [x] PM [ ]	7.99	12	3900	<5	110	940	0.50	<0.005	<1	<1
TEST REPORTING UNITS:			**pH Units**	**mg/L**	**uS/cm**	**mg/L**	**mg O/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**
TEST METHOD DETECTION LIMIT:*			0.05	1.0	1.0	5.0	25	0.5	0.1	0.005	1.0	1.0
TEST METHOD USED:			SM-4500HB	SM-2540D	E120.1	SM-5310C	E410.4	SM2320B	E350.1	E335.4	E8330	
ANALYZED BY (SELF/LAB):			BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

TSS - Total Suspended Solids SC - Specific Conductance O & G - Oil & Grease
COD - Chemical Oxygen Demand NA - not applicable E - EPA Method
N/S - Not Sampled
* Test method detection limits may vary slightly by location. Listed limits are for the laboratory control "Method Blank" sample.

Lawrence Livermore National Laboratory Experimental Test Site
Annual Storm Water Monitoring Report for Waste Discharge Requirements 97-03-DWQ
July 2010

Form 1- Sampling & Analysis Result for the First Storm Event 2009–10 Annual Report (cont.)

- If analytical results are less than the detection limit (or non detectable), show the value as less than the numerical value of the detection limit (example: <.05)
- If you did not analyze for a required parameter, do not report "0". Instead, leave the appropriate box blank.
- When analysis is done using portable analysis (such as portable pH meters, SC meters, etc.), indicate "PA" in the appropriate test method used box.
- Make additional copies of this form as necessary.

NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Karl Brunckhorst

DESCRIBE DISCHARGE LOCATION	**ANALYTICAL RESULTS For First Storm Event**								
	OTHER PARAMETERS: Metals								
	Arsenic	Beryllium	Cadmium	Iron	Lead	Magnesium	Mercury	Selenium	Silver
N883	0.0054	<0.002	0.0052	14	0.29	6.2	<0.0002	0.0069	<0.001
NPT7	<0.002	<0.002	<0.0005	6.1	<0.005	2.5	<0.0002	<0.002	<0.001
NLIN2	0.035	<0.004	<0.0005	16	0.0055	53	<0.0002	0.014	<0.001
NLIN **NOT SAMPLED FIRST STORM**	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
CARW2 (Off-Site; in creek, upstream)	0.028	<0.004	0.00061	71	0.028	31	<0.0002	0.0026	<0.001
GEOCRK (Off-Site; in creek, downstream)	0.0066	<0.004	<0.0005	0.84	<0.005	120	<0.0002	0.0057	<0.001
TEST REPORTING UNITS:	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
TEST METHOD DETECTION LIMIT*:	0.002	0.0002	0.0005	0.05	0.001	0.05	0.0002	0.002	0.001
TEST METHOD USED:	E200.8	E210.2	E200.8	E200.7	E200.8	E200.7	E245.1	E200.8	E200.8
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

E - EPA Method

N/S - Not Sampled

* Test method detection limits may vary slightly by location. Listed limits are for the laboratory control "Method Blank" sample.

Form 1- Sampling & Analysis Result for the First Storm Event 2009–10 Annual Report (cont.)

- If analytical results are less than the detection limit (or non detectable), show the value as less than the numerical value of the detection limit (example: <.05)
- If you did not analyze for a required parameter, do not report "0". Instead, leave the appropriate box blank.
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NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Karl Brunckhorst

DESCRIBE DISCHARGE LOCATION	**ANALYTICAL RESULTS For First Storm Event**					
	OTHER PARAMETERS: Radioactive					
	Gross Alpha	Gross Beta	Tritium	U234*	U235*	U238*
N883	0.127±0.080	0.381±0.097	0.799±1.450	6.3±2.9	0.35±0.69	5.7±2.7
NPT7	0.211±0.097	0.251±0.085	0.320±1.365	3.3±2.0	-0.30±0.73	2.9±1.9
NLIN2	0.51±0.273	1.406±0.3.5	0.259±1.380	90±16	5.1±2.7	75±14
NLIN **NOT SAMPLED FIRST STORM**	N/S	N/S	N/S	N/S	N/S	N/S
CARW2 (Off-Site; in creek, upstream)	1.454±.544	1.647±.429	0.899±1.410	26.0±6.8	1.0±1.4	23.0±6.3
GEOCRK (Off-Site; in creek, downstream)	0.038±0.177	0.969±0.315	2.105±1.543	140±24	9.5±3.9	120±21
TEST REPORTING UNITS:	**Bq/L**	**Bq/L**	**Bq/L**	**mBq/L**	**mBq/L**	**mBq/L**
TEST METHOD DETECTION LIMIT:	0.074 Bq/L (2 pCi/L)	0.11 Bq/L (3 pCi/L)	3.7 Bq/L (100 pCi/L)	3.7 mBq/L (0.1 pCi/L)	3.7 mBq/L (0.1 pCi/L)	3.7 mBq/L (0.1 pCi/L)
TEST METHOD USED:	E900	E900	E906	ALPHA SPEC	ALPHA SPEC	ALPHA SPEC
ANALYZED BY (SELF/LAB):	GEL Lab	GEL Lab	GEL Lab	GEL Lab	GEL Lab	GEL Lab

E - EPA Method

N/S - Not Sampled

* Note that concentrations (or activities) of uranium (U) isotopes are expressed as mBq/L = Bq/1000L (1 pCi = 37 mBq).

Form 1- Sampling & Analysis Result for the First Storm Event 2009–10 Annual Report (cont.)

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NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Karl Brunckhorst

DESCRIBE DISCHARGE LOCATION	**ANALYTICAL RESULTS For First Storm Event**						
	OTHER PARAMETERS: Dioxins & Furans						
	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD
NLIN2**	<0.534	2.3	4.21	8.35	6.9	190	1660
CARW2** (Off-Site; in creek, upstream)	1.41	6.59	7.18	16.7	15.1	204	1270
GEOCRK** (Off-Site; in creek, downstream)	<0.568	<0.572	<0.729	<0.751	<0.717	<0.79	3.49
TEST REPORTING UNITS:	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**
TEST METHOD DETECTION LIMIT***:	0.415	0.443	0.686	0.722	0.696	0.864	5.13
TEST METHOD USED:	E8290	E8290	E8290	E8290	E8290	E8290	E8290
ANALYZED BY (SELF/LAB):	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest

E - EPA Method

** - Polychlorinated biphenyl (PCB) monitoring results were all "not detected" from locations NLIN2, CARW2, and GEOCRK. Analyses were performed using method E8020A with a method detection limit of 0.10 μg/L.

*** Test method detection limits may vary slightly by location. Listed limits are for the laboratory control "Method Blank" sample.

**** Vista is a subcontractor to Caltest.

Form 1- Sampling & Analysis Result for the First Storm Event 2009–10 Annual Report (cont.)

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- When analysis is done using portable analysis (such as portable pH meters, SC meters, etc.), indicate "PA" in the appropriate test method used box.

NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Karl Brunckhorst

DESCRIBE DISCHARGE LOCATION	**ANALYTICAL RESULTS For First Storm Event**									
	OTHER PARAMETERS: Dioxins & Furans (cont.)									
	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
NLIN2**	<0.518	<0.799	<0.803	4.61	2.31	2.72	<0.864	56.5	4.53	186
CARW2** (Off-Site; in creek, upstream)	0.447	<0.362	<0.615	4.07	4.14	4.12	2.3	57.1	3.57	117
GEOCRK** (Off-Site; in creek, downstream)	<0.466	<0.495	<0.474	<0.285	<0.32	<0.394	<0.502	<0.792	<0.754	1.87
TEST REPORTING UNITS:	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**
TEST METHOD DETECTION LIMIT***:	0.368	0.444	0.429	0.415	0.418	0.700	0.613	0.823	0.788	0.952
TEST METHOD USED:	E8290	E8290	E8290	E8290	E8290	E8290	E8290	E8290	E8290	E8290
ANALYZED BY (SELF/LAB):	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest

E - EPA Method

** - Polychlorinated biphenyl (PCB) monitoring results were all "not detected" from locations NLIN2, CARW2, and GEOCRK. Analyses were performed using method E8020A with a method detection limit of 0.10 µg/L.

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Form 1- Sampling & Analysis Result for the First Storm Event 2009–10 Annual Report (concluded)

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NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Karl Brunckhorst

DESCRIBE DISCHARGE LOCATION	**ANALYTICAL RESULTS For First Storm Event**							
	OTHER PARAMETERS: Dioxins & Furans (concluded)							
	Total TCDD	Total PeCDD	Total HxCDD	Total HpCDD	Total TCDF	Total PeCDF	Total HxCDF	Total HpCDF
NLIN2**	<0.534	2.3	49.1	322	<0.518	6.06	46.3	163
CARW2** (Off-Site; in creek, upstream)	4.29	21.7	101	353	4.68	23.4	74	146
GEOCRK** (Off-Site; in creek, downstream)	<0.568	<0.572	<0.732	<0.79	<0.466	<0.484	<0.375	<0.773
TEST REPORTING UNITS:	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**
TEST METHOD DETECTION LIMIT***:	0.415	0.443	0.701	0.790	0.368	0.436	0.375	0.806
TEST METHOD USED:	E8290	E8290	E8290	E8290	E8290	E8290	E8290	E8290
ANALYZED BY (SELF/LAB):	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest

E - EPA Method
** - Polychlorinated biphenyl (PCB) monitoring results were all "not detected" from locations NLIN2, CARW2, and GEOCRK. Analyses were performed using method E8020A with a method detection limit of 0.10 μg/L.
*** Test method detection limits may vary slightly by location. Listed limits are for the laboratory control "Method Blank" sample.
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Lawrence Livermore National Laboratory Experimental Test Site
Annual Storm Water Monitoring Report for Waste Discharge Requirements 97-03-DWQ
July 2010

Form 1- Sampling & Analysis Result for the Second Storm Event 2009-10 Annual Report

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NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Gary Bear, Karen Folks

DESCRIBE DISCHARGE LOCATION	DATE/TIME OF SAMPLE COLLECTION	TIME DISCHARGE STARTED	ANALYTICAL RESULTS For Second Storm Event									
			BASIC PARAMETERS					OTHER PARAMETERS				
			pH	TSS	SC	O & G	COD	Total Hardness	Ammonia Nitrogen (as N)	Cyanide	HMX	RDX
N883	2/9/10 7:40 [x] PM [ ]	Ongoing AM [x] PM [ ]	6.53	26	24.8	<5	<25	N/S	<0.1	<0.005	N/S	N/S
NPT7	2/9/10 8:20 [x] PM [ ]	Ongoing AM [x] PM [ ]	8.12	14	116	<5	<25	N/S	<0.1	<0.005	N/S	N/S
NLIN2	2/9/10 8:55 [x] PM [ ]	Ongoing AM [x] PM [ ]	8.27	94	738	<5	38	240	<0.1	<0.005	<1	<1
NLIN	2/9/10 9:56 [x] PM [ ]	Ongoing AM [x] PM [ ]	N/S	11	N/S	N/S	N/S	N/S	N/S	N/S	<1	<1
CARW2 (Off-Site; in creek, upstream)	2/9/10 10:38 [x] PM [ ]	Ongoing AM [x] PM [ ]	8.38	28	958	<5.6	<25	350	<0.1	<0.005	<1	<1
GEOCRK (Off-Site; in creek, downstream)	2/9/10 11:08 [x] PM [ ]	Ongoing AM [x] PM [ ]	8.41	9.6	2000	<5	45	560	<0.1	<0.005	<1	<1
TEST REPORTING UNITS:			**pH Units**	**mg/L**	**uS/cm**	**mg/L**	**mg O/L**	**mg/L**	**mg/L**	**mg/L**	**ug/L**	**ug/L**
TEST METHOD DETECTION LIMIT:*			0.05	1.0	1.0	5.0	25	0.5	0.1	0.005	1.0	1.0
TEST METHOD USED:			SM-4500HB	SM-2540D	E120.1	SM-5310C	E410.4	SM2320B	E350.1	E335.4	E8330	
ANALYZED BY (SELF/LAB):			BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

TSS - Total Suspended Solids SC - Specific Conductance O & G - Oil & Grease
COD - Chemical Oxygen Demand NA - not applicable E - EPA Method
N/S - Not Sampled
* Test method detection limits may vary slightly by location. Listed limits are for the laboratory control "Method Blank" sample.

Form 1- Sampling & Analysis Result for the Second Storm Event 2009–10 Annual Report (cont.)

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- Make additional copies of this form as necessary.

NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Gary Bear, Karen Folks

DESCRIBE DISCHARGE LOCATION	**ANALYTICAL RESULTS For Second Storm Event**								
	OTHER PARAMETERS: Metals								
	Arsenic	Beryllium	Cadmium	Iron	Lead	Magnesium	Mercury	Selenium	Silver
N883	<0.002	<0.0002	<0.0005	0.8	<0.005	0.73	<0.0002	<0.002	<0.001
NPT7	0.0021	<0.0002	<0.0005	1.9	<0.005	2.6	<0.0002	<0.002	<0.001
NLIN2	0.024	<0.0002	<0.0005	5.6	<0.005	28	<0.0002	0.0033	<0.001
NLIN	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
CARW2 (Off-Site; in creek, upstream)	0.0021	<0.0002	<0.0005	3.5	<0.005	37	<0.0002	<0.002	<0.001
GEOCRK (Off-Site; in creek, downstream)	0.0034	<0.0002	<0.0005	1	<0.005	60	<0.0002	<0.002	<0.001
TEST REPORTING UNITS:	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**	**mg/L**
TEST METHOD DETECTION LIMIT*:	0.002	0.0002	0.0005	0.05	0.001	0.05	0.0002	0.002	0.001
TEST METHOD USED:	E200.8	E210.2	E200.8	E200.7	E200.8	E200.7	E245.1	E200.8	E200.8
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

E - EPA Method
N/S - Not Sampled
* Test method detection limits may vary slightly by location. Listed limits are for the laboratory control "Method Blank" sample.

Form 1- Sampling & Analysis Result for the Second Storm Event 2009–10 Annual Report (cont.)

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- Make additional copies of this form as necessary.

NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Gary Bear, Karen Folks

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event					
	OTHER PARAMETERS: Radioactive					
	Gross Alpha	Gross Beta	Tritium	U234*	U235*	U238*
N883	0.002±0.027	0.029±0.038	0.127±2.079	0.001±0.002	0±0.001	0.002±0.002
NPT7	-0.005±0.026	0.040±0.039	-0.363±1.954	0.005±0.003	0±0.001	0.009±0.004
NLIN2	0.293±0.105	0.283±0.075	-0.788±1.931	0.093±0.022	0.004±0.003	0.127±0.028
NLIN	N/S	N/S	N/S	N/S	N/S	N/S
CARW2 (Off-Site; in creek, upstream)	0.080±0.053	0.108±0.046	0.121±1.987	0.057±0.014	0.002±0.002	0.038±0.011
GEOCRK (Off-Site; in creek, downstream)	0.185±0.072	0.112±0.048	1.217±1.898	0.072±0.018	0.005±0.004	0.055±0.015
TEST REPORTING UNITS:	**Bq/L**	**Bq/L**	**Bq/L**	**mBq/L**	**mBq/L**	**mBq/L**
TEST METHOD DETECTION LIMIT:	0.074 Bq/L (2 pCi/L)	0.11 Bq/L (3 pCi/L)	3.7 Bq/L (100 pCi/L)	3.7 mBq/L (0.1 pCi/L)	3.7 mBq/L (0.1 pCi/L)	3.7 mBq/L (0.1 pCi/L)
TEST METHOD USED:	E900	E900	E906	ALPHA SPEC	ALPHA SPEC	ALPHA SPEC
ANALYZED BY (SELF/LAB):	GEL Lab	GEL Lab	GEL Lab	GEL Lab	GEL Lab	GEL Lab

E - EPA Method
N/S - Not Sampled
* Note that concentrations (or activities) of uranium (U) isotopes are expressed as mBq/L = Bq/1000L (1 pCi = 37 mBq).

Form 1- Sampling & Analysis Result for the Second Storm Event 2009–10 Annual Report (cont.)

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NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Gary Bear, Karen Folks

DESCRIBE DISCHARGE LOCATION	**ANALYTICAL RESULTS For Second Storm Event**						
	OTHER PARAMETERS: Dioxins & Furans						
	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD
NLIN2**	1.45	3.32	4.27	4.3	4.36	49.9	459
CARW2** (Off-Site; in creek, upstream)	1.56	2.85	4.48	4.84	4.63	2.76	8.35
GEOCRK** (Off-Site; in creek, downstream)	1.83	3.82	3.24	3.23	3.4	7.63	10.7
TEST REPORTING UNITS:	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**
TEST METHOD DETECTION LIMIT***:	0.415	0.443	0.686	0.722	0.696	0.864	5.13
TEST METHOD USED:	E8290	E8290	E8290	E8290	E8290	E8290	E8290
ANALYZED BY (SELF/LAB):	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest

E - EPA Method

** - Polychlorinated biphenyl (PCB) monitoring results were all "not detected" from locations NLIN2, CARW2, and GEOCRK. Analyses were performed using method E8020A with a method detection limit of 0.10 μg/L.

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Form 1- Sampling & Analysis Result for the Second Storm Event 2009–10 Annual Report (cont.)

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NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Gary Bear, Karen Folks

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event									
	OTHER PARAMETERS: Dioxins & Furans (cont.)									
	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
NLIN2**	1.36	3.01	3.03	2.58	2.64	3.12	3.68	13.7	2.16	57.6
CARW2** (Off-Site; in creek, upstream)	1.07	2.35	2.17	1.42	1.55	1.69	2.1	2.72	2.81	2.74
GEOCRK** (Off-Site; in creek, downstream)	1.15	3	3.17	0.719	0.734	0.875	0.968	1.85	1.95	4.69
TEST REPORTING UNITS:	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**
TEST METHOD DETECTION LIMIT***:	0.368	0.444	0.429	0.415	0.418	0.700	0.613	0.823	0.788	0.952
TEST METHOD USED:	E8290	E8290	E8290	E8290	E8290	E8290	E8290	E8290	E8290	E8290
ANALYZED BY (SELF/LAB):	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest

E - EPA Method

** - Polychlorinated biphenyl (PCB) monitoring results were all "not detected" from locations NLIN2, CARW2, and GEOCRK. Analyses were performed using method E8020A with a method detection limit of 0.10 μg/L.

*** Test method detection limits may vary slightly by location. Listed limits are for the laboratory control "Method Blank" sample.

**** Vista is a subcontractor to Caltest.

Form 1- Sampling & Analysis Result for the Second Storm Event 2009–10 Annual Report (concluded)

- If analytical results are less than the detection limit (or non detectable), show the value as less than the numerical value of the detection limit (example: <.05)
- If you did not analyze for a required parameter, do not report "0". Instead, leave the appropriate box blank.
- When analysis is done using portable analysis (such as portable pH meters, SC meters, etc.), indicate "PA" in the appropriate test method used box.

NAME OF PERSON COLLECTING SAMPLE(S): Bob Williams, Gary Bear, Karen Folks

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event							
	OTHER PARAMETERS: Dioxins & Furans (concluded)							
	Total TCDD	Total PeCDD	Total HxCDD	Total HpCDD	Total TCDF	Total PeCDF	Total HxCDF	Total HpCDF
NLIN2**	<1.45	<3.32	<9.29	79.6	<1.36	<3.02	3.36	13.7
CARW2** (Off-Site; in creek, upstream)	<1.56	<2.85	<4.65	<2.76	<1.07	<2.25	<1.68	<2.76
GEOCRK** (Off-Site; in creek, downstream)	<1.83	<3.82	<3.29	<7.63	<1.15	<3.08	<0.817	<1.89
TEST REPORTING UNITS:	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**	**pg/L**
TEST METHOD DETECTION LIMIT***:	0.415	0.443	0.701	0.790	0.368	0.436	0.375	0.806
TEST METHOD USED:	E8290	E8290	E8290	E8290	E8290	E8290	E8290	E8290
ANALYZED BY (SELF/LAB):	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest	Vista****/ Caltest

E - EPA Method
** - Polychlorinated biphenyl (PCB) monitoring results were all "not detected" from locations NLIN2, CARW2, and GEOCRK. Analyses were performed using method E8020A with a method detection limit of 0.10 µg/L.
*** Test method detection limits may vary slightly by location. Listed limits are for the laboratory control "Method Blank" sample.
**** Vista is a subcontractor to Caltest.

SIDE A

FORM 2-QUARTERLY VISUAL OBSERVATIONS OF AUTHORIZED NON-STORM WATER DISCHARGES (NSWDs)

- Quarterly dry weather visual observations are required of each authorized NSWD.
- Observe each authorized NSWD source, impacted drainage area, and discharge location.
- Authorized NSWDs must meet the conditions provided in Section D (pages 5-6), of the General Permit.
- Make additional copies of this form as necessary.

QUARTER: **JULY-SEPT.** DATE: 9 / 22 / 09	**Observers Name:** Karl Bruncknorst **Title: Scientific Technologist** Observations were made at the seven locations identified on Form 4.	**WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?**	☐ **YES** ☒ **NO**
QUARTER: **OCT.-DEC.** DATE: 10 / 13 / 09	**Observers Name:** Karl Bruncknorst **Title: Scientific Technologist** Observations were made at the seven locations identified on Form 4.	**WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?**	☐ **YES** ☒ **NO**
QUARTER: **JAN.-MARCH** DATE: 2 / 09 / 10	**Observers Name:** Karl Bruncknorst **Title: Scientific Technologist** Observations were made at the seven locations identified on Form 4.	**WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?**	☐ **YES** ☒ **NO**
QUARTER: **APRIL-JUNE** DATE: 5 / 20 / 10	**Observers Name:** Karl Bruncknorst **Title: Scientific Technologist** Observations were made at the seven locations identified on Form 4.	**WERE ANY AUTHORIZED NSWDs DISCHARGED DURING THIS QUARTER?**	☐ **YES** ☒ **NO**

If **YES**, complete reverse side of this form.

SIDE B

FORM 2-QUARTERLY VISUAL OBSERVATIONS OF AUTHORIZED NON-STORM WATER DISCHARGES (NSWDs)

DATE /TIME OF OBSERVATION	SOURCE AND LOCATION OF AUTHORIZED NSWD EXAMPLE: Air conditioner Units on Building C	NAME OF AUTHORIZED NSWD EXAMPLE: Air conditioner condensate	DESCRIBE AUTHORIZED NSWD CHARACTERISTICS Indicate whether authorized NSWD is clear, cloudy, or discolored, causing staining, contains floating objects or an oil sheen, has odors, etc.		DESCRIBE ANY REVISED OR NEW BMPs AND PROVIDE THEIR IMPLEMENTATION DATE
			At the NSWD Source	At the NSWD Drainage Area and Discharge Location	
__/__/__ __:__ ☐ AM ☐ PM					
__/__/__ __:__ ☐ AM ☐ PM					
__/__/__ __:__ ☐ AM ☐ PM					
__/__/__ __:__ ☐ AM ☐ PM					

SIDE A

FORM 3-QUARTERLY VISUAL OBSERVATIONS OF UNAUTHORIZED NON-STORM WATER DISCHARGES (NSWDs)

- Unauthorized NSWDs are discharges (such as wash or rinse waters) that do not meet the conditions provided in Section D (pages 5-6) of the General Permit.
- Quarterly visual observations are required to observe current and detect prior unauthorized NSWDs.
- Quarterly visual observations are required during dry weather and at all facility drainage areas.
- Each unauthorized NSWD source, impacted drainage area, and discharge location must be identified and observed.
- Unauthorized NSWDs that can not be eliminated within 90 days of observation must be reported to the Regional Board in accordance with Section A.10.e of the General Permit.
- Make additional copies of this form as necessary.

QUARTER: **JULY-SEPT.** **DATE/TIME OF OBSERVATIONS** 09/22/09 9:03 – 10:08 AM	**Observers Name:** Karl Brunckhorst **Title: Scientific Technologist** Observations were made at the seven locations identified on Form 4.	**WERE UNAUTHORIZED NSWDs OBSERVED?** **WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NSWDs?**	**NO** **NO**	If **YES** to either question, complete reverse side.
QUARTER: **OCT.-DEC.** **DATE/TIME OF OBSERVATIONS** 10/13/09 8:30 – 11:13 AM	**Observers Name:** Karl Brunckhorst & Bob Williams **Title: Scientific Technologist/Field Ops Manager** Observations were made at the seven locations identified on Form 4.	**WERE UNAUTHORIZED NSWDs OBSERVED?** **WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NSWDs?**	**NO** **NO**	If **YES** to either question, complete reverse side.
QUARTER: **JAN.-MARCH** **DATE/TIME OF OBSERVATIONS** 02/9/10 7:40 – 11:08 AM	**Observers Name: Bob Williams** **Title: Field Operations Manager** Observations were made at the seven locations identified on Form 4.	**WERE UNAUTHORIZED NSWDs OBSERVED?** **WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NSWDs?**	**NO** **NO**	If **YES** to either question, complete reverse side.
QUARTER: **APRIL-JUNE** **DATE/TIME OF OBSERVATIONS** 05/20/10 09:32 – 10:14 AM	**Observers Name:** Karl Brunckhorst **Title: Scientific Technologist** Observations were made at the seven locations identified on Form 4.	**WERE UNAUTHORIZED NSWDs OBSERVED?** **WERE THERE INDICATIONS OF PRIOR UNAUTHORIZED NSWDs?**	**NO** **NO**	If **YES** to either question, complete reverse side.

SIDE B

FORM 3 QUARTERLY VISUAL OBSERVATIONS OF UNAUTHORIZED NON-STORM WATER DISCHARGES (NSWDs)

OBSERVATION DATE (FROM REVERSE SIDE)	**NAME OF UNAUTHORIZED NSWD** EXAMPLE: Vehicle Wash Water	**SOURCE AND LOCATION OF UNAUTHORIZED NSWD** EXAMPLE: NW Corner of Parking Lot	**DESCRIBE UNAUTHORIZED NSWD CHARACTERISTICS** Indicate whether unauthorized NSWD is clear, cloudy, discolored, causing stains; contains floating objects or an oil sheen, has odors, etc.		**DESCRIBE CORRECTIVE ACTIONS TO ELIMINATE UNAUTHORIZED NSWD AND TO CLEAN IMPACTED DRAINAGE AREAS. PROVIDE UNAUTHORIZED NSWD ELIMINATION DATE.**
			AT THE UNAUTHORIZED NSWD SOURCE	**AT THE UNAUTHORIZED NSWD AREA AND DISCHARGE LOCATION**	
__/__/__ __:__ AM ☐ PM ☐					
__/__/__ __:__ AM ☐ PM ☐					
__/__/__ __:__ AM ☐ PM ☐					
__/__/__ __:__ AM ☐ PM ☐					

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SIDE A

FORM 4-MONTHLY VISUAL OBSERVATIONS OF STORM WATER DISCHARGES

- Storm water discharge visual observations are required for at least one storm event per month between October 1 and May 31.
- Visual observations must be conducted during the first hour of discharge at all discharge locations.
- Discharges of temporarily stored or contained storm water must be observed at the time of discharge
- Indicate "None" in the first column of this form if you did not conduct a monthly visual observation.
- Make additional copies of this form as necessary.
- Until a monthly visual observation is made, record any eligible storm events that do not result in a storm water discharge and note the date, time, name, and title of who observed there was no storm water discharge.

Observation Date: October 13 2009 Observers Name: Bob Williams Title: Field Operations Manager	Drainage Location Description	#1- CARW2	#2 - NPT6	#3 - N829	#4 - N883
	Observation Time	11 : 26 A.M.	11 : 13 A.M.	11 : 11 A.M.	8 : 30 A.M.
	Time Discharge Began	**There was significant runoff beginning at approx. 7:00 a.m. continuing through 16:00 p.m. at sample locations CARW2, N883, NPT7, NLIN2 and GEOCRK for samples to be collected. There was no runoff at NPT6 or N829.**			
	Were Pollutants Observed * (If yes, complete reverse side)	Yes	No	No	Yes
Observation Date: November 30 2009 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#1- CARW2	#2 - NPT6	#3 - N829	#4 - N883
	Observation Time	09 : 48 A.M.	09 : 54 A.M.	09 : 58 A.M.	10 : 12 A.M.
	Time Discharge Began	**There was no runoff during the inspection. Based on the low rainfall and observations made, there was likely no storm water runoff in November during hours of operation.**			
	Were Pollutants Observed * (If yes, complete reverse side)	No	No	No	No
Observation Date: December 07 2009 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#1- CARW2	#2 - NPT6	#3 - N829	#4 - N883
	Observation Time	09 : 31 A.M.	09 : 24 A.M.	09 : 37 A.M.	09 : 41 A.M.
	Time Discharge Began	**There was insignificant runoff at sample locations NPT7 and N883 during the observation period (approximately one hour). Due to lower than normal temperatures during this storm event, precipitation was in the form of snow and the insignificant runoff observed at NPT7 and N883 was likely due to snow melt. There was no runoff at CARW2, NLIN2, N829, NPT6 or GEOCRK.**			
	Were Pollutants Observed * (If yes, complete reverse side)	Yes	No	No	No
Observation Date: January 21 2010 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#1- CARW2	#2 - NPT6	#3 - N829	#4 - N883
	Observation Time	10 : 00 A.M.	09 : 55 A.M.	09 : 52 A.M.	10 : 12 A.M.
	Time Discharge Began	**There was significant runoff at the time of the observations at locations NPT7, NLIN2, N883, CARW2 and GEOCRK. However, runoff likely began on January 18 during non-operating hours and continued on and off throughout the week. Therefore, this was a non-qualifying storm event and samples were not collected. There was no runoff at locations NPT6 and N829.**			
	Were Pollutants Observed * (If yes, complete reverse side)	Yes	No	No	No

* When there is runoff in these open channels (like CARW2), there is some turbidity because of mobilized sediments, but no visual contamination. Leaves, sticks, and other debris are common in all channels.

SIDE B

FORM 4-MONTHLY VISUAL OBSERVATIONS OF STORM WATER DISCHARGES

DATE/TIME OF OBSERVATION (From Reverse Side)	**DRAINAGE AREA DESCRIPTION** EXAMPLE: Discharge from material storage Area #2	**DESCRIBE STORM WATER DISCHARGE CHARACTERISTICS** Indicate whether storm water discharge is clear, cloudy, or discolored; causing staining; containing floating objects or an oil sheen, has odors, etc.	**IDENTIFY AND DESCRIBE SOURCE(S) OF POLLUTANTS** EXAMPLE: Oil sheen caused by oil dripped by trucks in vehicle maintenance area.	**DESCRIBE ANY REVISED OR NEW BMPs AND THEIR DATE OF IMPLEMENTATION**
10 /13/09 11:26 AM	Upstream sample location CARW2	There was significant runoff at the time of the inspection and there was high turbidity in the runoff.	Source of turbidity is unknown.	Not applicable, this is an off site location.
10/13/09 08: 30 AM	N883	There was significant runoff at the time of the inspection and there was a light brown/orange color in the runoff.	Source of discoloration is most likely the result of organic leaf litter material in the storm drain.	Between the first and second monitoring events LLNL added additional grounds maintenance activities for leafy debris clean-up in the N883 area.
12 /07/09 09:31 AM	Upstream sample location CARW2	There was no runoff at the time of the inspection, but there was high turbidity in the standing water.	Source of turbidity is unknown.	Not applicable, this is an off site location.
1 /21/10 10:00 AM	Upstream sample location CARW2	There was significant runoff at the time of the inspection and there was high turbidity in the runoff.	Source of turbidity is unknown.	Not applicable, this is an off site location.

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FORM 4 (Continued)-MONTHLY VISUAL OBSERVATIONS OF STORM WATER DISCHARGES

- Storm water discharge visual observations are required for at least one storm event per month between October 1 and May 31.
- Visual observations must be conducted during the first hour of discharge at all discharge locations.
- Discharges of temporarily stored or contained storm water must be observed at the time of discharge.
- Indicate "None" in the first column of this form if you did not conduct a monthly visual observation.
- Make additional copies of this form as necessary.
- Until a monthly visual observation is made, record any eligible storm events that do not result in a storm water discharge and note the date, time, name, and title of who observed there was no storm water discharge.

Observation Date: February 9 2010 Observers Name: Bob Williams Title: Field Operations Manager	Drainage Location Description	#1- CARW2	#2 - NPT6	#3 - N829	#4 - N883
	Observation Time	10 : 38 A.M.	11 : 00 A.M.	11 : 05 A.M.	7 : 40 A.M.
	Time Discharge Began	**There was significant runoff beginning at approx. 7:30 a.m. continuing through 10:00 a.m. at sample locations CARW2, N883, NPT7, NLIN2 and GEOCRK for samples to be collected. There was no runoff at NPT6 or N829.**			
	Were Pollutants Observed * (If yes, complete reverse side)	No	No	No	No
Observation Date: March 3 2010 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#1- CARW2	#2 - NPT6	#3 - N829	#4 - N883
	Observation Time	09 : 58 A.M.	10 : 03 A.M.	10 : 04 A.M.	10 : 07 A.M.
	Time Discharge Began	**There was significant runoff beginning at approx. 1:00 p.m. on March 2nd continuing through 4:00 p.m. March 3rd at sample locations CARW2, N883, NPT7, NLIN2 and GEOCRK. There was no runoff at NPT6 or N829.**			
	Were Pollutants Observed * (If yes, complete reverse side)	No	No	No	No
Observation Date: April 20 2010 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#1- CARW2	#2 - NPT6	#3 - N829	#4 - N883
	Observation Time	9 : 08 A.M.	9 : 03 A.M.	9 : 14 A.M.	9 : 18 A.M.
	Time Discharge Began	**There was insignificant runoff during the inspection. There was significant ephemeral flow at CARW2 at the time of the inspection.**			
	Were Pollutants Observed * (If yes, complete reverse side)	No	No	No	No
Observation Date: May 20 2010 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#1- CARW2	#2 - NPT6	#3 - N829	#4 - N883
	Observation Time	09 : 32 P.M.	09 : 35 P.M.	09 : 37 P.M.	09 : 52 P.M.
	Time Discharge Began	**There was no runoff during the inspection. There was insignificant rainfall in May.**			
	Were Pollutants Observed * (If yes, complete reverse side)	No	No	No	No

* When there is runoff in these open channels (like CARW2), there is some turbidity because of mobilized sediments, but no visual contamination. Leaves, sticks, and other debris are common in all channels.

SIDE B

FORM 4-MONTHLY VISUAL OBSERVATIONS OF STORM WATER DISCHARGES

DATE/TIME OF OBSERVATION (From Reverse Side)	**DRAINAGE AREA DESCRIPTION** EXAMPLE: Discharge from material storage Area #2	**DESCRIBE STORM WATER DISCHARGE CHARACTERISTICS** Indicate whether storm water discharge is clear, cloudy, or discolored; causing staining; containing floating objects or an oil sheen, has odors, etc.	**IDENTIFY AND DESCRIBE SOURCE(S) OF POLLUTANTS** EXAMPLE: Oil sheen caused by oil dripped by trucks in vehicle maintenance area.	**DESCRIBE ANY REVISED OR NEW BMPs AND THEIR DATE OF IMPLEMENTATION**
__/__/__ __:__ AM ☐ PM ☐				
__/__/__ __:__ AM ☐ PM ☐				
__/__/__ __:__ AM ☐ PM ☐				
__/__/__ __:__ AM ☐ PM ☐				

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FORM 4 (Continued)-MONTHLY VISUAL OBSERVATIONS OF STORM WATER DISCHARGES

- Storm water discharge visual observations are required for at least one storm event per month between October 1 and May 31.
- Visual observations must be conducted during the first hour of discharge at all discharge locations.
- Discharges of temporarily stored or contained storm water must be observed at the time of discharge
- Indicate "None" in the first column of this form if you did not conduct a monthly visual observation.
- Make additional copies of this form as necessary.
- Until a monthly visual observation is made, record any eligible storm events that do not result in a storm water discharge and note the date, time, name, and title of who observed there was no storm water discharge.

Observation Date: October 13 2009 Observers Name: Karl Brunckhorst and Bob Williams Title: Scientific Technologist/Field Ops Manager	Drainage Location Description	#5 – NPT7	#6 - NLIN2*	#7 - GEOCRK*
	Observation Time	9 : 20 A.M.	9 : 45 A.M.	10 : 37 A.M.
	Time Discharge Began	**There was significant runoff beginning at approx. 7:00 a.m. continuing through 16:00 p.m. at sample locations CARW2, N883, NPT7, NLIN2 and GEOCRK for samples to be collected. There was no runoff at NPT6 or N829.**		
	Were Pollutants Observed ** (If yes, complete reverse side)	No	Yes	Yes
Observation Date: November 30 2009 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#5 – NPT7	#6 - NLIN2*	#7 - GEOCRK*
	Observation Time	10 : 28 A.M.	10 : 41 A.M.	11: 01 A.M.
	Time Discharge Began	**There was no runoff during the inspection. Based on the low rainfall and observations made, there was likely no storm water runoff in November during hours of operation.**		
	Were Pollutants Observed ** (If yes, complete reverse side)	No	Yes	Yes
Observation Date: December 7 2009 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#5 – NPT7	#6 - NLIN2*	#7 - GEOCRK*
	Observation Time	10 : 13 A.M.	09 : 57 A.M.	10 : 39 A.M.
	Time Discharge Began	**There was insignificant runoff at sample locations NPT7 and N883 during the observation period (approximately one hour). Due to lower than normal temperatures during this storm event, precipitation was in the form of snow and the insignificant runoff observed at NPT7 and N883 was likely due to snow melt. There was no runoff at CARW2, NLIN2, N829, NPT6 or GEOCRK.**		
	Were Pollutants Observed ** (If yes, complete reverse side)	No	No	Yes
Observation Date: January 21 2010 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#5 - NPT7	#6 - NLIN2*	#7 - GEOCRK*
	Observation Time	10 : 37 A.M.	10 : 25 A.M.	9 : 44 A.M
	Time Discharge Began	**There was significant runoff at the time of the observations at locations NPT7, NLIN2, N883, CARW2 and GEOCRK. However, runoff likely began on January 18 during non-operating hours and continued on and off throughout the week. Therefore, this was a non-qualifying storm event and samples were not collected. There was no runoff at locations NPT6 and N829.**		
	Were Pollutants Observed ** (If yes, complete reverse side)	No	No	Yes

* NLIN2 and GEOCRK generally have flow from springs located upstream of each location.
** When there is runoff in these open channels (NLIN2 and GEOCRK), there is some turbidity because of mobilized sediments but no visual contamination. Leaves, sticks, and other debris are common in all channels.

SIDE B

FORM 4-MONTHLY VISUAL OBSERVATIONS OF STORM WATER DISCHARGES

DATE/TIME OF OBSERVATION (From Reverse Side)	DRAINAGE AREA DESCRIPTION EXAMPLE: Discharge from material storage Area #2	DESCRIBE STORM WATER DISCHARGE CHARACTERISTICS Indicate whether storm water discharge is clear, cloudy, or discolored; causing staining; containing floating objects or an oil sheen, has odors, etc.	IDENTIFY AND DESCRIBE SOURCE(S) OF POLLUTANTS EXAMPLE: Oil sheen caused by oil dripped by trucks in vehicle maintenance area.	DESCRIBE ANY REVISED OR NEW BMPs AND THEIR DATE OF IMPLEMENTATION
10 / 13 / 09 9 : 45 AM	Sample location NLIN2	There was significant runoff during the inspection and there was high turbidity in the runoff. A burnt wood odor was also noted at the time of the inspection and sampling.	The area was recently burned by a wild fire. Floating leaves and sticks were also observed.	To minimize erosion, the area was recently hydro-seeded.
10 / 13 / 09 10 : 37 AM	Downstream sample location GEOCRK	There was significant runoff during the inspection. Debris, including a refrigerator was noted in the creek bed at the time of the inspection.	Sample location is near Corral Hollow Creek where occasional roadside dumping occurs and roadside trash collects.	Not applicable, this is an off site location.
11 / 30 / 09 10 : 41 AM	Sample location NLIN2	There was no runoff during the inspection.	The area was recently burned by a wild fire. Floating leaves and sticks were also observed.	To minimize erosion, the area was recently hydro-seeded.
11 / 30 / 09 9 : 39 AM	Downstream sample location GEOCRK	There was no runoff during the inspection. Water flows through the sample location from an upstream spring. Debris, including a refrigerator was noted in the creek bed at the time of the inspection.	Sample location is near Corral Hollow Creek where occasional roadside dumping occurs and roadside trash collects.	Not applicable, this is an off site location.
12 / 07 / 09 10 : 39 AM	Downstream sample location GEOCRK	There was no runoff during the inspection. Water flows through the sample location from an upstream spring. Debris, including a refrigerator was noted in the creek bed at the time of the inspection.	Sample location is near Corral Hollow Creek where occasional roadside dumping occurs and roadside trash collects.	Not applicable, this is an off site location.
01 / 21 / 10 9 : 44 AM	Downstream sample location GEOCRK	There was significant runoff during the inspection. Debris, including a refrigerator was noted in the creek bed at the time of the inspection. There was high turbidity in the runoff.	Sample location is near Corral Hollow Creek where occasional roadside dumping occurs and roadside trash collects.	Not applicable, this is an off site location.

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FORM 4 (Continued)-MONTHLY VISUAL OBSERVATIONS OF STORM WATER DISCHARGES

- Storm water discharge visual observations are required for at least one storm event per month between October 1 and May 31.
- Visual observations must be conducted during the first hour of discharge at all discharge locations.
- Discharges of temporarily stored or contained storm water must be observed at the time of discharge.
- Indicate "None" in the first column of this form if you did not conduct a monthly visual observation.
- Make additional copies of this form as necessary.
- Until a monthly visual observation is made, record any eligible storm events that do not result in a storm water discharge and note the date, time, name, and title of who observed there was no storm water discharge.

Observation Date: February 9 2010 Observers Name: Bob Williams Title: Field Operations Manager	Drainage Location Description	#5 - NPT7	#6 - NLIN2*	#7 - GEOCRK*
	Observation Time	8 : 20 A.M.	8 : 55 A.M.	11 : 08 A.M.
	Time Discharge Began	**There was significant runoff beginning at approx. 7:30 a.m. continuing through 10:00 a.m. at sample locations CARW2, N883, NPT7, NLIN2 and GEOCRK for samples to be collected. There was no runoff at NPT6 or N829.**		
	Were Pollutants Observed ** (If yes, complete reverse side)	No	No	No
Observation Date: March 3 2010 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#5 - NPT7	#6 - NLIN2*	#7 - GEOCRK*
	Observation Time	10 : 32 A.M.	10 : 21 A.M.	10 : 54 A.M.
	Time Discharge Began	**There was significant runoff beginning at approx. 1:00 p.m. on March 2nd continuing through 4:00 p.m. March 3rd at sample locations CARW2, N883, NPT7, NLIN2 and GEOCRK. There was no runoff at NPT6 or N829.**		
	Were Pollutants Observed ** (If yes, complete reverse side)	No	No	No
Observation Date: April 20 2010 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#5 - NPT7	#6 - NLIN2*	#7 - GEOCRK*
	Observation Time	9 : 41 A.M.	9 : 33 A.M.	10 : 02 A.M.
	Time Discharge Began	**There was insignificant runoff during the inspection.**		
	Were Pollutants Observed ** (If yes, complete reverse side)	No	No	No
Observation Date: May 20 2010 Observers Name: Karl Brunckhorst Title: Scientific Technologist	Drainage Location Description	#5 - NPT7	#6 - NLIN2*	#7 - GEOCRK*
	Observation Time	10 : 14 P.M.	10 : 04 P.M.	09 : 44 P.M.
	Time Discharge Began **	**There was no runoff during the inspection. There was insignificant rainfall in May.**		
	Were Pollutants Observed (If yes, complete reverse side)	No	No	No

* NLIN2 and GEOCRK generally have flow from springs located upstream of each location.
** When there is runoff in these open channels (NLIN2 and GEOCRK), there is some turbidity because of mobilized sediments but no visual contamination. Leaves, sticks, and other debris are common in all channels.

SIDE B

FORM 4 (Continued)-MONTHLY VISUAL OBSERVATIONS OF STORM WATER DISCHARGES

DATE/TIME OF OBSERVATION (From Reverse Side)	DRAINAGE AREA DESCRIPTION EXAMPLE: Discharge from material storage Area #2	DESCRIBE STORM WATER DISCHARGE CHARACTERISTICS Indicate whether storm water discharge is clear, cloudy, or discolored; causing staining; containing floating objects or an oil sheen, has odors, etc.	IDENTIFY AND DESCRIBE SOURCE(S) OF POLLUTANTS EXAMPLE: Oil sheen caused by oil dripped by trucks in vehicle maintenance area.	DESCRIBE ANY REVISED OR NEW BMPs AND THEIR DATE OF IMPLEMENTATION
__/__/__ __:__ AM ☐ PM ☐				
__/__/__ __:__ AM ☐ PM ☐				
__/__/__ __:__ AM ☐ PM ☐				
__/__/__ __:__ AM ☐ PM ☐				

FORM 5-ANNUAL COMPREHENSIVE SITE COMPLIANCE EVALUATION POTENTIAL POLLUTANT SOURCE/INDUSTRIAL ACTIVITY BMP STATUS

EVALUATION DATE: **February 2010 - April 2010**

SIGNATURE: **Signed copies of the Annual Inspection Summary Certification Forms are provided in the Data Supplement**

NOTE: **Annual Facility Inspection Summary Forms are also provided in the Data Supplement**

PRINCIPAL DIRECTORATE RESPONSIBLE FOR POTENTIAL POLLUTANT SOURCE/INDUSTRIAL ACTIVITY	HAVE ANY BMPs NOT BEEN FULLY IMPLEMENTED?	ARE ADDITIONAL/ REVISED BMPs NECESSARY?	Describe deficiencies in BMPs or BMP implementation and Describe additional/revised BMPs or corrective actions and their date(s) of implementation
Directors Office	**YES**	**NO**	Existing BMPs for erosion control at the S300 Pistol Range are implemented, but not adequate, to prevent the erosion caused by ground squirrel activity, as noted during the 2/17/10 inspection. Repairs have been initiated and call for the installation of a barrier (e.g., some combination of rock/fabric/mesh) to inhibit further erosion.
Science and Technology (Engineering Directorate)	**NO**	**NO**	
Weapons and Complex Integration	**NO**	**NO**	
Operations and Business	**NO**	**NO**	

Attachment 3

Explanation of Exceedances of EPA Benchmark Parameters

Compliance Approach, LLNL Site 300 Specific Threshold Criteria, and Discussion of Analytical Results

Explanation of Exceedances of EPA Benchmark Parameters

Compliance Approach, LLNL Site 300 Specific Threshold Criteria, and Discussion of Analytical Results

Site 300 is a remote experimental test site located in the Altamont Hills of the Diablo Range. It occupies approximately 7,000 acres, which consists of a series of steep hills and ridges oriented along a generally northwest-southeast trend, separated by intervening ravines. The elevation at Site 300 ranges from approximately 500 feet above sea level in the southeast portion of the site to 1,750 feet above sea level in the northwestern quadrant of the site. Approximately five percent of the 7,000 acres are developed. Storm water travels mostly through natural drainage courses and discharges into Corral Hollow Creek, which is along the southern and eastern boundary of the site. Corral Hollow Creek is an ephemeral stream that drains toward the San Joaquin basin. The creek terminates in an agricultural field east of Chrisman Road in Tracy. There is no visual evidence of a direct connection between Corral Hollow Creek and the San Joaquin River or any surface tributaries leading to the river. The river and its surface tributaries are more than 5 miles from the last visible portion of Corral Hollow Creek.

Though some of the storm water monitoring results at Site 300 exceed EPA benchmark values, the source of the constituents does not generally originate from the Site 300 industrial activities, rather from sediment transport through the natural drainage channels. LLNL believes that because of the unique rural characteristics at Site 300, storm water runoff quality is not comparable to the typical industrial facility and, therefore, the EPA benchmark values are not directly applicable. Beginning in 2000, LLNL established site-specific threshold comparison criteria to identify out-of-the-ordinary data that potentially would indicate inadequate best management practices (BMP) and would merit further investigation to determine if concentrations of the monitored parameters are increasing in storm water discharges. LLNL staff believes that this site-specific approach is in keeping with watershed management principles and provides a strong tool to evaluate BMP effectiveness.

As previously directed by the Regional Board, only results for samples collected from on-site discharge locations are reviewed in this report. LLNL also monitors an upstream receiving water location (CARW2), which is unaffected by Site 300 storm water discharges associated with industrial activities, and a downstream receiving water location (GEOCRK) on the Corral Hollow Creek (See **Figure 1** in **Attachment 1**). These two locations are important for understanding the background watershed water quality and local environment, which is consistent with EPA's use of benchmarks in relation to natural background pollutant levels in Section 6.2.1 of the 2008 Multi-Sector General Permit (MSGP).

Storm water monitoring results at Site 300 that exceed EPA benchmark values

In the 2009–2010 wet weather season, the Site 300 monitoring program included five discharge sampling locations; three of which discharged storm water runoff:

- NLIN2 – An on-site location in Elk Ravine to characterize a storm water runoff from a number of industrial activities that have storm water discharges into Elk Ravine, which is located downstream from a ground water-fed spring and an associated wetland area;

- N883 – An on-site location at a storm drain outfall, which characterizes runoff from the Resource Conservation and Recovery Act (RCRA) permitted container storage area, located in a mostly paved area; and
- NPT7 – An on-site location at the outfall from the drainage diversion structure to characterize storm water runoff from a closed landfill.

No runoff was observed to occur from two other routine sampling locations (NPT6 and N829). For the 2009–2010 wet season, the Site 300 storm water monitoring results above the EPA benchmark values are shown below in **Table 3**.

Table 3. Summary of Site 300 storm water monitoring results that exceed EPA benchmark values.

			Storm Water Monitoring Location & Date					
	EPA Benchmark Value	**Units**	NLIN2		N883		NPT7	
Analyte			10/13/09	2/19/10	10/13/09	2/19/10	10/13/09	2/19/10
TSS[a]	100.	mg/L	390	[d]	140	[d]	130	[d]
Iron	1.0	mg/L	16	5.6	14	[d]	6.1	1.9
Lead	0.0816	mg/L	[d]	[d]	0.29	[d]	[d]	[d]
SC[b]	300-500	µmhos/cm	1230	738	[d]	[d]	[d]	[d]
COD[c]	120	mg/L	430	[d]	440	[d]	[d]	[d]

[a] TSS = Total Suspended Solids

[b] SC = Specific Conductance

[c] COD = Chemical Oxygen Demand

[d] Result did not exceed EPA benchmark value

In addition to the analytes shown in **Table 3**, which are discussed below because they exceeded EPA benchmark values, two other analytes (cyanide and HMX) warrant additional discussion. Cyanide and HMX were detected in the samples collected during the 10/13/09 storm and, although there are no EPA benchmarks for these analytes, they could possibly result from industial activities. These detections (cyanide at N883 and NLIN2 and HMX at NLIN2) are suspect, however, because the accuracy and precision requirements were not met for matrix spike recoveries. Hence, the contract analytical laboratory flagged the quality control (QC) results for these analytes. Furthermore, a duplicate sample, collected at N883 within minutes of the initial sample, failed to show any cyanide above the analytical reporting limit (0.005 mg/L). Neither analyte was detected in any sample collected during the second (2/9/10) storm; however, LLNL will continue to monitor these parameters to determine if additional BMPs are necessary.

Sources of pollutants that contribute to the exceedances in Site 300 storm water

Iron and total suspended solids (TSS) are from sediments moving through the natural drainage channels and are the result of erosion upstream and within the channels. For this reason, LLNL has not established a Site 300-specific threshold criteria for iron. However, iron is naturally occurring in soil as ferric oxides, and iron concentrations in storm water samples are correlated with the TSS values as demonstrated in **Figure 2** (below). This correlation suggests that the iron is sediment associated, as opposed to resulting from non-sediment sources (e.g., leaching from exposed materials).

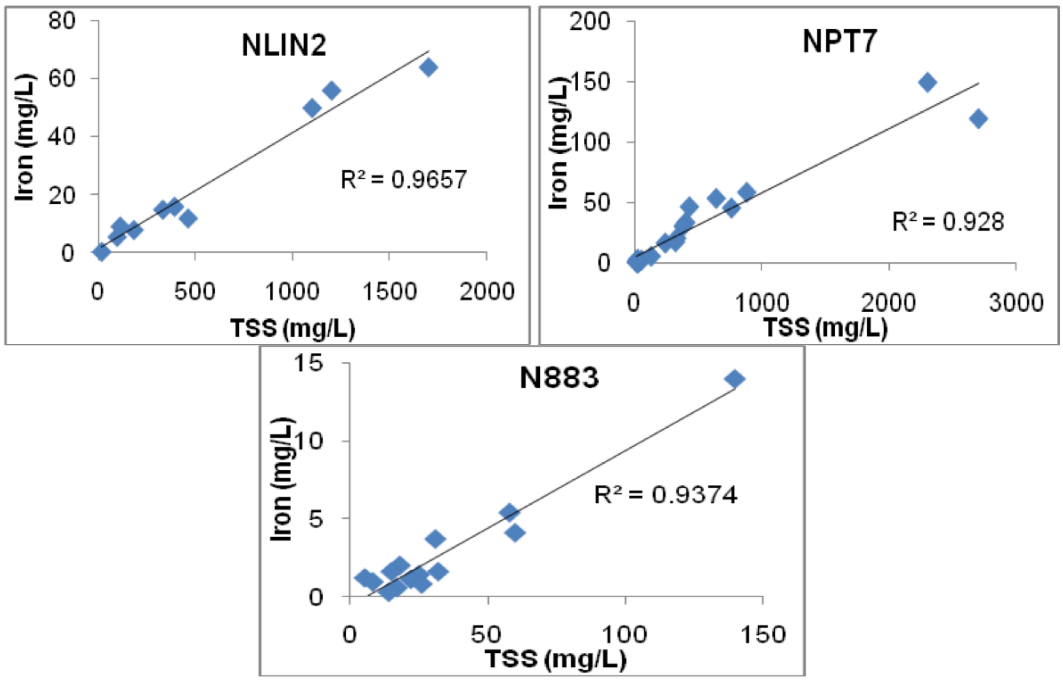

Figure 2. Demonstrated correlation between iron and TSS at LLNL S300 discharge locations.

While the TSS concentrations in the samples collected during the first storm from locations NLIN2, N883, and NPT7 were above the EPA benchmark value, they were below the corresponding upstream sample value at CARW2 (1200 mg/L) and the Site 300-specific threshold value (1700 mg/L).

Although lead was reported above the EPA benchmark value in the 10/13/09 sample collected at N883, this result is believed to be a sampling artifact for the following two reasons. First, immediately after this sample was collected, a second sample was collected at the same location for QC purposes. The lead concentration in the QC sample was reported as 0.009 mg/L, approximately an order of magnitude below the EPA benchmark value. Second, lead concentrations in storm water runoff collected at this location are historically at or below the 0.005 mg/L reporting limit. Nevertheless, as discussed below, additional grounds maintenance activities have been implemented for the General Services Area (GSA) (N883 area) and LLNL will continue to monitor for this analyte.

Specific conductance results above EPA benchmark values were reported for both storm water samples collected at NLIN2. Two sources have been identified as possible contributors to these results. The first is a naturally occurring spring (Spring 6), just upstream of the NLIN2 sampling location. Specific conductance (SC) values, for the groundwater discharged from this spring, range from 700 – 870 µmhos/cm. This SC range is consistent with the SC results typically reported for storm water runoff samples from NLIN2. In addition, a wildfire that burned through the area around this sampling location in June 2009, just a few months before the first storm of the season, could also have contributed to the SC value reported for the sample collected at NLIN2 on 10/13/09.

COD ranges broadly and water quality samples vary with the intensity of the storms and the ability of the storm water to move sediment and organic debris. The COD value for the 10/13/09 storm sample at location NLIN2 is most likely the result of the organic matter left behind after the wildfire that burned through that area in June 2009. Field observations noted “a freshly burnt wood smell” at the time this sample was collected. Organic material in the first storm sample collected at N883 (possibly leaf litter,

as noted in the field observations, along with a light brown/orange discoloration) is also a probable cause for this elevated COD result. As discussed below, between the first and second monitoring events, LLNL added additional grounds maintenance activities for leafy debris clean-up in the N883 area. COD results for both locations sampled on 2/9/10 were well below the EPA benchmark value.

Review of current BMPs and modifications/additions to reduce or eliminate the discharge of pollutants

Based on LLNL's evaluation of the monitoring data and through comparison to the Site 300-specific threshold values, LLNL believes that the storm water monitoring results for 2009–2010 are within expected values and do not merit further investigation of potential sources at Site 300 or additional best management practices. However, LLNL recognizes the importance of implementing best management practices for water quality protection; hence, LLNL implements best management practices throughout the site, not only at industrial facilities. The constituents exceeding EPA benchmark values are largely associated with sediment transport, which is a natural process in this steeply sloped Corral Hollow Creek watershed. LLNL continues to implement a program to address general housekeeping, and erosion and sediment transport issues throughout the site.

Ongoing BMP activities include:

- **TSS and Iron at NLIN2** – Following the wildfire in June 2009, the lower reaches of Elk Ravine were hydroseeded and vegetation is re-establishing well. Also, as mentioned above, sampling location NLIN2 is in the lower valley below the Elk Ravine watershed and includes discharges from areas unrelated to industrial activities. At the base of the watershed is a two-stage constructed wetland designed for wildlife habitat, with an additional function of sediment entrapment. The NLIN2 sampling location is currently upstream of this wetland due to safety concerns about access downstream during storms. The area previously included explosives storage, so limiting access to the vicinity during periods of lightening was a standard safety practice. The explosives storage area is now closed allowing LLNL sampling crews access to collect storm water samples downstream of the constructed wetland. Recently, LLNL has been able to implement sampling at the downstream location (NLIN) to compare water quality at NLIN2.

- **COD and SC at NLIN2** – It is likely that the elevated COD and SC values are related to the June 2009 wildfire and potentially the hydroseeding that followed. LLNL will continue to monitor these parameters to determine if additional BMPs are necessary.

- **TSS and Iron at NPT7** – The location NPT7 drains runoff from the Pit 7 Complex to the north. The drained area includes a RCRA cap and adjacent hillslopes. Sediment sources are largely believed to be created by rodent burrows near the concrete surface water diversion channel for the RCRA cap. There is a sediment trap in the channel that is cleaned out as needed. In addition, LLNL will continue to inspect the pit cap quarterly and note any additional need for clean out of the diversion channel at that time. Results of pit cap inspections and routine maintenance are reported to the Central Valley Regional Water Quality Control Board (CVRWQCB) in quarterly monitoring reports. LLNL will perform annual clean-outs of the Pit 7 sediment trap prior to the rainy season starting in 2010.

- **TSS, Iron, and COD at N883** – Location N883 drains the GSA that includes a RCRA Permitted Storage Facility. This area is maintained and materials are stored in accordance with good housekeeping BMPs in the Site 300 Storm Water Pollution Prevention Plan (SWPPP) and the RCRA permit. Again, LLNL will continue to work on other sediment management projects, which will control sediment originating from a drainage channel that flows through the site in the GSA in the southeastern quadrant of the site. LLNL will continue grounds maintenance activities for leafy debris clean-up and removal in the GSA upstream of sampling location N883. The data from the second storm suggests that this BMP is effective for COD, iron, and TSS.

LLNL assessment of BMPs has identified some opportunities for improvement of additional controls. These additional BMPs are being implemented in areas other than where the industrial activities occur (as defined by SIC codes) on-site. It is our conclusion that no changes to BMPs in the industrial areas are required at this time, other than scheduling an annual preseason cleanout of the Pit 7 drainage structure sediment trap. LLNL will continue to implement and maintain its storm water program.

In addition, LLNL continues to pursue funding opportunities for priority erosion projects identified by Consolidated Engineering Laboratories in their 2000 preliminary erosion assessment of Site 300, as well as evaluating recently developed erosion areas. Some of these projects are upstream of the storm water sampling locations. BMPs actively being implemented at Site 300 in response to 2009–2010 data include:

- **TSS and Iron at NLIN2** – LLNL plans to close a fire trail near Building 845, which is a potential source for TSS in storm water runoff. Access to the fire trail has already been restricted. Potential erosion areas in the Elk Ravine have been prioritized for erosion control activities as funding becomes available.

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